UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,669	01/18/2002	Li-Wei Hsu	205032000700	5533

25225 7590 02/03/2004

MORRISON & FOERSTER LLP
3811 VALLEY CENTRE DRIVE
SUITE 500
SAN DIEGO, CA 92130-2332

EXAMINER	
BISSETT, MELANIE D	

ART UNIT	PAPER NUMBER
1711	

DATE MAILED: 02/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/052,669	HSU ET AL.
	Examiner	Art Unit
	Melanie D. Bissett	1711

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,20 and 21* is/are rejected.

7)☒ Claim(s) *16-19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *1103* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Summary of the Independent Claims

1. Claim 1 is drawn to a surface-treated plastic slide comprising a plastic slide and a coating. The intended use for the slide is for immobilizing proteins, peptides, and small molecules; the intended use for the coating is for spacing purposes. Note that these intended use limitations are given little patentable weight, since any coated slide capable of being manipulated to immobilize such materials would be encompassed. Claim 15 is drawn to a surface-treated polystyrene slide comprising a polystyrene slide and a coating. The intended use for the slide is for immobilizing oligonucleotides or polynucleotides; the intended use for the coating is for spacing purposes. Again, note that these intended use limitations are given little patentable weight, since any coated slide capable of being manipulated to immobilize such materials would be encompassed.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-14 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The term "small molecules" in claim 1 is a relative term which renders the claim indefinite. The term "small molecules" is not defined by the claim, the specification does

not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

5. Claim 5 recites "ranges from less than 0.03 mm to 0.5 mm". In this case, the scope of the range is unclear by the recitation of the lower limit "less than 0.03 mm". Since the lower limit is not clearly defined, the claim is indefinite. This argument also applies for claim 21.

6. Also, claims 5 and 21 recite "the depth of the cavity chambers". Since claims 4 and 20, from which claims 5 and 21 depend, only recite "at least one cavity chamber", it is unclear whether claims 5 and 21 are further intended to limit the slide to have multiple cavity chambers.

7. Claim 8 recites the limitation "the NH2 group(s)-providing precursor" in line 1. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 11 recites the limitation "the amino group(s)" in line 2. There is insufficient antecedent basis for this limitation in the claim.

9. Furthermore, claim 11 limits the epoxy group(s) to react with amino group(s). From this recitation, it is unclear whether the applicant intends to claim the product having the two layers *reacted* or whether the epoxy layer is *capable of reacting* with amino groups.

10. Claim 12 recites the limitation "the other end" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 10, from which claim 12 depends, only limits the epoxide to contain epoxy groups at each end. The claim does not limit one epoxy group, where one of skill in the art would recognize "at the other end".

11. Claim 12 recites the limitation "the free hydroxyl, sulfhydryl or amino groups of the proteins, peptides or small molecules" in lines 2-3. However, claim 1 is not written in such a way that the proteins, peptides, or small molecules are part of the structure. Rather, the slide has an intended use of immobilizing the materials. In this case, it is unclear whether the applicant intends to claim the epoxide *reacted* with the proteins, peptides, or small molecules or whether the applicant intends to claim the epoxide groups are *capable of reacting* the materials. If the applicant intends to claim the reacted structure, claim 1 should reflect that such a protein, peptide, or small molecule layer is present in the structure.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 1-2, 9, and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Ho et al.

14. Ho discloses a high-density functional slide comprising a sol-gel coating containing silanes to form a biochip or microarray (abstract; [0008]). Substrate

materials include polymers of ethylene, propylene, ester, and/or acrylic monomers [0028]. The slides are used to immobilize nucleic acids, oligonucleotides, and proteins [0038-0039]. Note that the silane and polyaldehyde coatings have multiple functionalities. Although the reference does not seem to differentiate homogeneous or heterogeneous proteins, peptides, or small molecules, it is noted that the "proteins, peptides, or small molecules" are part of an intended use limitation. It is the examiner's position that the slides of Ho's invention would be capable of use for immobilizing homogeneous or heterogeneous proteins by the mention of immobilizing proteins.

15. Claims 1-3, 9-12, and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Brown.

16. Brown discloses coating compositions for laboratory apparatus articles comprising a hardenable resinous material (abstract). Exemplary resinous materials include epoxy resins (col. 3 lines 10-19). The coatings have a porous surface which retains or isolates biological samples (col. 3 lines 36-40; col. 4 line 63-col. 5 line 5). Thus, it is the examiner's position that the slides are capable of use for immobilizing proteins, small molecules, oligonucleotides, polynucleotides, etc. Substrate materials include microscope slides, slide assemblies, or slide coverslips comprising plastic (col. 4 lines 38-48). More specific plastic materials include polypropylene, polyethylene, polystyrene, and polycarbonate (col. 12 lines 25-41). In a discussion of coating materials, diglycidyl ethers of bisphenol A and trimethylol propane triglycidyl ether epoxy materials are specified, which are polyfunctional materials (col. 6 lines 16-36). Although

the reference does not seem to differentiate homogeneous or heterogeneous proteins, peptides, or small molecules, it is noted that the "proteins, peptides, or small molecules" are part of an intended use limitation. It is the examiner's position that the slides of Brown's invention would be capable of use for immobilizing homogeneous or heterogeneous proteins by the mention of isolating biological materials. Also, it is the examiner's position that the epoxy groups of the coating are inherently capable of reacting with any amino, hydroxyl, sulfhydryl groups that may contact the coating.

17. Claims 1, 4-5, and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Cunningham et al.

18. Cunningham discloses biosensor materials comprising a substrate layer, a grating layer, and an epoxy or plastic cover layer [0007], where binding substances are immobilized on the cover layer [0011]. Binding substances include nucleic acids, polypeptides, and small molecules [0013]. Substrate materials include plastic flat shapes [109]. By the drawings of thin flat substrates, it is the examiner's position that the reference suggests the use of plastic slide substrates. Cunningham also teaches that the grating layer forms a repeated pattern of shape having a depth of about 0.01-1 μm (0.00001-0.001 mm) [0012]. Because the reference teaches individual shapes having a depth of 0.001 mm, it is the examiner's position that the reference suggests cavities having depths of less than 0.03 mm. Although the reference does not seem to differentiate homogeneous or heterogeneous proteins, peptides, or small molecules, it is noted that the "proteins, peptides, or small molecules" are part of an intended use

limitation. It is the examiner's position that the slides of Cunningham's invention would be capable of use for immobilizing homogeneous or heterogeneous proteins by the mention of immobilizing small molecules.

19. Claims 1-3 and 9-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Swan et al.

20. Swan discloses a method for the covalent attachment of target molecules onto a substrate using an epoxide coating (abstract). Epoxide coatings include reaction products of hydroxyl polymers with diepoxyoctane or diepoxydecane [0040], which would have epoxy groups at either end and would have carbon chains of 8 or 10. Substrates include acrylic, polystyrene, polycarbonate, or polyolefin slides [0058], and target molecules include nucleic acids, proteins, and polysaccharides [0060]. Although the reference does not seem to differentiate homogeneous or heterogeneous proteins, peptides, or small molecules, it is noted that the "proteins, peptides, or small molecules" are part of an intended use limitation. It is the examiner's position that the slides of Swan's invention would be capable of use for immobilizing homogeneous or heterogeneous proteins by the mention of immobilizing proteins. Also, it is the examiner's position that the epoxy groups of the coating are inherently capable of reacting with any amino, hydroxyl, sulfhydryl groups that may contact the coating. Note that the reference suggests pretreatment of the surface with ammonia plasma, which would provide amine groups on the surface [0034].

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

22. Claims 2-3, 15, and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cunningham et al. in view of Swan et al.

23. Cunningham applies as above, teaching the use of glass or plastic substrates but failing to specify the plastic materials. Swan teaches coated slides for immobilizing biomaterials, where glass and plastic slides are taught as equivalents [0058]. Specific materials for the plastic slides include polystyrene, acrylics, polycarbonate, and polyolefins. It is the examiner's position that it would have been prima facie obvious to use a conventional glass equivalent substrate for the plastic substrates of Cunningham's invention with the expectancy of forming a coated plastic substrate having equally improved biomaterial immobilization.

Allowable Subject Matter

24. Claims 6-8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

25. Claims 16-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

26. The following is a statement of reasons for the indication of allowable subject matter:

27. The closest prior art, Swan et al. (US 2003/0113792 A1), discloses epoxide-coated plastic slides for immobilizing biomaterials. Although the reference teaches that ammonia plasma may be used to pre-treat the substrates, the reference does not teach a pre-treatment method comprising a treatment with an aldehyde followed by a treatment with an amine compound. Also, the reference does not teach a coating comprising a coating buffer and a cationic polymer under an alkaline condition. Therefore, it is the examiner's position that the use of such pretreatment or coating compositions in a coated slide substrate would provide a novel and unobvious step over the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie D. Bissett whose telephone number is (571) 272-1068. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

mdb

James J. S[illegible]
Supervisory Pate[illegible]
Technology Cen[illegible]